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RAW SEQUENCE LISTING
 PATENT APPLICATION: US/09/977,653

DATE: 11/01/2001
 TIME: 10:48:36

Input Set : A:\MA-702D2.ST25.txt
 Output Set: N:\CRF3\11012001\I977653.raw

3 <110> APPLICANT: Thompson, Mark
 4 Knuth, Mark
 5 Cardineau, Guy
 7 <120> TITLE OF INVENTION: Bacillus thuringiensis Toxins with Improved Activity
 9 <130> FILE REFERENCE: MA-702D2
 C--> 11 <140> CURRENT APPLICATION NUMBER: US/09/977,653
 C--> 11 <141> CURRENT FILING DATE: 2001-10-15
 11 <150> PRIOR APPLICATION NUMBER: US 09/222,594
 12 <151> PRIOR FILING DATE: 1998-12-28
 14 <150> PRIOR APPLICATION NUMBER: US 08/904,278
 15 <151> PRIOR FILING DATE: 1998-07-31
 17 <160> NUMBER OF SEQ ID NOS: 10
 19 <170> SOFTWARE: PatentIn version 3.1
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 22 <211> LENGTH: 1425
 23 <212> TYPE: DNA
 24 <213> ORGANISM: Bacillus thuringiensis
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 31 aaacaagaat gggctacgat tggagcatat attcagactg gattaggttt accagtaaat 180
 33 gaacaacaat taagaacaca tgtaattta agtcaggata tatcaatacc tagtgatttt 240
 35 tctcaattat atgatgtta ttgttctgat aaaacttcag cagaatggtg gaataaaaaat 300
 37 ttatatcctt taattattaa atctgctaatt gatattgctt catatggttt taaagttgct 360
 39 ggtgatcctt ctattaagaa agatggatatt tttaaaaaat tgcaagatga attagataat 420
 41 attgttgata ataattccga ttagtgcata atagctaaag ctattaaga tttaaagcg 480
 43 cgatgtggta tttaattaa agaagctaaa caatatgaag aagctgcaaa aaatattgt 540
 45 acatctttag atcaattttt acatggtgat cagaaaaaat tagaagggtgt tatcaatatt 600
 47 caaaaacggt taaaagaagt tcaaacagct cttaatcaag cccatgggg aagtagtcca 660
 49 gctcataaaag agttattttaga aaaagtaaaa aattttaaaaa caacattttaga aaggactatt 720
 51 aaagctgaac aagattttaga gaaaaaaagta gaatatagtt ttcttatttgg accattgtta 780
 53 ggatttgtt tttatgaaat tcttggaaat actgctgttc agcatataaa aaatcaaatt 840
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 57 attagaatgt taaaatgtt taatacagat attgataatt tatatagtca aggacaagaa 960
 59 gcaattaaag tttccaaaaa gtacaaggt atttggctt ctattggagc tcaaataagaa 1020
 61 aatcttagaa caacgtcggtt acaagaagtt caagattctg atgatgctga tgagatacaa 1080
 63 attgaacttg aggacgcttc ttagtgcatttgg tttagttgtgg ctcaagaagc tcgtgatttt 1140
 65 acaactaaatg cttattcaac taatagttaga caaaattttac cgattaatgt tatatcagat 1200
 67 tcatgttaatt gttcaacaac aaatatgaca tcaaataat acagtaatcc aacaacaaat 1260
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 78 <212> TYPE: PRT
 79 <213> ORGANISM: Bacillus thuringiensis
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83 Met Ile Ile Asp Ser Lys Thr Thr Leu Pro Arg His Ser Leu Ile His
84 1 5 10 15
87 Thr Ile Lys Leu Asn Ser Asn Lys Lys Tyr Gly Pro Gly Asp Met Thr
88 20 25 30
91 Asn Gly Asn Gln Phe Ile Ile Ser Lys Gln Glu Trp Ala Thr Ile Gly
92 35 40 45
95 Ala Tyr Ile Gln Thr Gly Leu Gly Leu Pro Val Asn Glu Gln Gln Leu
96 50 55 60
99 Arg Thr His Val Asn Leu Ser Gln Asp Ile Ser Ile Pro Ser Asp Phe
100 65 70 75 80
103 Ser Gln Leu Tyr Asp Val Tyr Cys Ser Asp Lys Thr Ser Ala Glu Trp
104 85 90 95
107 Trp Asn Lys Asn Leu Tyr Pro Leu Ile Ile Lys Ser Ala Asn Asp Ile
108 100 105 110
111 Ala Ser Tyr Gly Phe Lys Val Ala Gly Asp Pro Ser Ile Lys Lys Asp
112 115 120 125
115 Gly Tyr Phe Lys Lys Leu Gln Asp Glu Leu Asp Asn Ile Val Asp Asn
116 130 135 140
119 Asn Ser Asp Asp Asp Ala Ile Ala Lys Ala Ile Lys Asp Phe Lys Ala
120 145 150 155 160
123 Arg Cys Gly Ile Leu Ile Lys Glu Ala Lys Gln Tyr Glu Glu Ala Ala
124 165 170 175
127 Lys Asn Ile Val Thr Ser Leu Asp Gln Phe Leu His Gly Asp Gln Lys
128 180 185 190
131 Lys Leu Glu Gly Val Ile Asn Ile Gln Lys Arg Leu Lys Glu Val Gln
132 195 200 205
135 Thr Ala Leu Asn Gln Ala His Gly Glu Ser Ser Pro Ala His Lys Glu
136 210 215 220
139 Leu Leu Glu Lys Val Lys Asn Leu Lys Thr Thr Leu Glu Arg Thr Ile
140 225 230 235 240
143 Lys Ala Glu Gln Asp Leu Glu Lys Lys Val Glu Tyr Ser Phe Leu Leu
144 245 250 255
147 Gly Pro Leu Leu Gly Phe Val Val Tyr Glu Ile Leu Glu Asn Thr Ala
148 260 265 270
151 Val Gln His Ile Lys Asn Gln Ile Asp Glu Ile Lys Lys Gln Leu Asp
152 275 280 285
155 Ser Ala Gln His Asp Leu Asp Arg Asp Val Lys Ile Ile Gly Met Leu
156 290 295 300
159 Asn Ser Ile Asn Thr Asp Ile Asp Asn Leu Tyr Ser Gln Gly Gln Glu
160 305 310 315 320
163 Ala Ile Lys Val Phe Gln Lys Leu Gln Gly Ile Trp Ala Thr Ile Gly
164 325 330 335
167 Ala Gln Ile Glu Asn Leu Arg Thr Thr Ser Leu Gln Glu Val Gln Asp
168 340 345 350
171 Ser Asp Asp Ala Asp Glu Ile Gln Ile Glu Leu Glu Asp Ala Ser Asp
172 355 360 365
175 Ala Trp Leu Val Val Ala Gln Glu Ala Arg Asp Phe Thr Leu Asn Ala
176 370 375 380
179 Tyr Ser Thr Asn Ser Arg Gln Asn Leu Pro Ile Asn Val Ile Ser Asp

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Input Set : A:\MA-702D2.ST25.txt
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184	405	410	415	
187	Pro Thr Thr Asn Met Thr Ser Asn Gln Tyr Met Ile Ser His Glu Tyr			
188	420	425	430	
191	Thr Ser Leu Pro Asn Asn Phe Met Leu Ser Arg Asn Ser Asn Leu Glu			
192	435	440	445	
195	Tyr Lys Cys Pro Glu Asn Asn Phe Met Ile Tyr Trp Tyr Asn Asn Ser			
196	450	455	460	
199	Asp Trp Tyr Asn Asn Ser Asp Trp Tyr Asn Asn			
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211	aactctaaca agaagtatgg tcctggcgat atgactaacg ggaaccagg catcatatcc		120	
213	aagcaagaat gggccacgat tggcgcatac attcagactg gactcggctt accagtgaat		180	
215	gagcaacagc tgagaaccca cgttaacctt agtcaagacca tcagcatacc atctgacttt		240	
217	tctcaactt acgatgtgtt ttgttctgac aagacttagt cagaatggtg gaacaagaat		300	
219	ctctatcattt tgatcatcaa gtctgccaat gacattgtt catatggttt caaagggtct		360	
221	ggtgatcattt cgatcaagaa agatggttac ttcaagaagc ttcaagatga actcgacaac		420	
223	attgttgaca acaactccga cgacgatgac atagccaaag ccatcaagga cttcaaaagca		480	
225	agatgtggca ttctcatcaa ggaagccaag cagtatgaag aagctgccaat gaacattgtt		540	
227	acatcattgtt atcaggattt ccatggagac cagaagaagc tcgagggtgt catcaacatt		600	
229	cagaaacgtc tgaaagaggt tcaaaccactt ctgaatcaag cccatggggaa atccaggcca		660	
231	gctcacaaag agcttcttga gaaagtgaag aacttgaaga ccacacttga gaggaccatc		720	
233	aaagctgaac aagacttggaa gaagaaaagta gactacagct ttctacttgg acccttggta		780	
235	ggctttgtt tctacgagat tcttggaaac actgtgttcc aacacatcaa gaatcaaattc		840	
237	gatgagatca agaaacagtt ggattctgac caacatgact tggatcgacca tgtgaagatc		900	
239	attggaatgc tcaacagcat caacactgac attgacaact tgtatagtc aggacaagaa		960	
241	gcaatcaaag tcttcagaa gctacaaggg atatggcca ctattggagc tcagatagag		1020	
243	aatcttcgca ccacgtccct tcaagaagtc caagactctg atgatgctga tgagatacag		1080	
245	attgaacttgg aggacgcattc tgatgcattt ttagttgtgg ctcaagaagc tcgtgacttc		1140	
247	acactgaatg cctactcaac caacagtca gagaatctcc cgatcaatgt gatctcagat		1200	
249	tcatgcaattt gtcaccac caacatgaca tccaatcgtt acagcaatcc aacaaccaac		1260	
251	atgacttagca atcagtagat gattgccat gaggatacca gcttgcacaa caacttcatg		1320	
253	ttgtcaagga attcaacccgtt ggagtacaag tgccctgaga acaacttcat gatctactgg		1380	
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270	20 25 30			

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Input Set : A:\MA-702D2.ST25.txt
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273 Asn Gly Asn Gln Phe Ile Ile Ser Lys Gln Glu Trp Ala Thr Ile Gly
274 35 40 45
277 Ala Tyr Ile Gln Thr Gly Leu Gly Leu Pro Val Asn Glu Gln Gln Leu
278 50 55 60
281 Arg Thr His Val Asn Leu Ser Gln Asp Ile Ser Ile Pro Ser Asp Phe
282 65 70 75 80
285 Ser Gln Leu Tyr Asp Val Tyr Cys Ser Asp Lys Thr Ser Ala Glu Trp
286 85 90 95
289 Trp Asn Lys Asn Leu Tyr Pro Leu Ile Ile Lys Ser Ala Asn Asp Ile
290 100 105 110
293 Ala Ser Tyr Gly Phe Lys Val Ala Gly Asp Pro Ser Ile Lys Lys Asp
294 115 120 125
297 Gly Tyr Phe Lys Lys Leu Gln Asp Glu Leu Asp Asn Ile Val Asp Asn
298 130 135 140
301 Asn Ser Asp Asp Asp Ala Ile Ala Lys Ala Ile Lys Asp Phe Lys Ala
302 145 150 155 160
305 Arg Cys Gly Ile Leu Ile Lys Glu Ala Lys Gln Tyr Glu Glu Ala Ala
306 165 170 175
309 Lys Asn Ile Val Thr Ser Leu Asp Gln Phe Leu His Gly Asp Gln Lys
310 180 185 190
313 Lys Leu Glu Gly Val Ile Asn Ile Gln Lys Arg Leu Lys Glu Val Gln
314 195 200 205
317 Thr Ala Leu Asn Gln Ala His Gly Glu Ser Ser Pro Ala His Lys Glu
318 210 215 220
321 Leu Leu Glu Lys Val Lys Asn Leu Lys Thr Thr Leu Glu Arg Thr Ile
322 225 230 235 240
325 Lys Ala Glu Gln Asp Leu Glu Lys Lys Val Glu Tyr Ser Phe Leu Leu
326 245 250 255
329 Gly Pro Leu Leu Gly Phe Val Val Tyr Glu Ile Leu Glu Asn Thr Ala
330 260 265 270
333 Val Gln His Ile Lys Asn Gln Ile Asp Glu Ile Lys Lys Gln Leu Asp
334 275 280 285
337 Ser Ala Gln His Asp Leu Asp Arg Asp Val Lys Ile Ile Gly Met Leu
338 290 295 300
341 Asn Ser Ile Asn Thr Asp Ile Asp Asn Leu Tyr Ser Gln Gly Gln Glu
342 305 310 315 320
345 Ala Ile Lys Val Phe Gln Lys Leu Gln Gly Ile Trp Ala Thr Ile Gly
346 325 330 335
349 Ala Gln Ile Glu Asn Leu Arg Thr Thr Ser Leu Gln Glu Val Gln Asp
350 340 345 350
353 Ser Asp Asp Ala Asp Glu Ile Gln Ile Glu Leu Glu Asp Ala Ser Asp
354 355 360 365
357 Ala Trp Leu Val Val Ala Gln Glu Ala Arg Asp Phe Thr Leu Asn Ala
358 370 375 380
361 Tyr Ser Thr Asn Ser Arg Gln Asn Leu Pro Ile Asn Val Ile Ser Asp
362 385 390 395 400
365 Ser Cys Asn Cys Ser Thr Thr Asn Met Thr Ser Asn Gln Tyr Ser Asn
366 405 410 415
369 Pro Thr Thr Asn Met Thr Ser Asn Gln Tyr Met Ile Ser His Glu Tyr

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Input Set : A:\MA-702D2.ST25.txt
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370	420	425	430
373	Thr Ser Leu Pro Asn Asn Phe Met	Leu Ser Arg Asn Ser Asn Leu Glu	
374	435	440	445
377	Tyr Lys Cys Pro Glu Asn Asn Phe Met	Ile Tyr Trp Tyr Asn Asn Ser	
378	450	455	460
381	Asp Trp Tyr Asn Asn Ser Asp Trp Tyr Asn Asn		
382	465	470	475
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395	cagactggac tcggcttacc agtgaatgag caacagctga gaacccacgt taaccttagt		180
397	caagacatca gcataccatc tgactttct caactctacg atgtgtattg ttctgacaag		240
399	actagtgcag aatggtgaa caagaatctc tatccttga tcatcaagtc tgccaatgac		300
401	attgcttcat atggttcaa agttgcttgt gatccttga tcaagaaaaga tggttacttc		360
403	aagaagcttc aagatgaact cgacaacatt gttgacaaca actccgacga cgatgcgata		420
405	gccaaagcca tcaaggactt caaagcaaga tgtggatttc tcatcaagga agccaaggcag		480
407	tatgaagaag ctgccaagaa cattgttaaca tcattggatc agtttctcca tggagaccag		540
409	aagaagctcg agggtgtcat caacattcag aaacgtctga aagaggttca aacagctctg		600
411	aatcaagccc atgggaatc cagtcagct cacaagagc ttcttgagaa agtgaagaac		660
413	ttgaagacca cacttgagag gaccatcaaa gctgaacaag acttggagaa gaaagttagag		720
415	tacagtttc tacttgacc cttgttaggc tttgtgtct acgagattct tgagaacact		780
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421	gacaacttgt atagtcaagg acaagaagca atcaaagtct ttcagaagct acaaggata		960
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425	gactctgtatgt atgctgtatgt gatacagatt gaacttgagg acgcattctga tgcattgtta		1080
427	gttgtggctc aagaagctcg tgacttcaca ctgaatgcct actcaacccaa cagtcgacag		1140
429	aatctcccgaa tcaatgtatgt ctcagattca tgcaattgtct ccaccacccaa catgacatcc		1200
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447	Pro Gly Asp Met Thr Asn Gly Asn Gln Phe Ile Ile Ser Lys Gln Glu		
448	20 25 30		
451	Trp Ala Thr Ile Gly Ala Tyr Ile Gln Thr Gly Leu Gly Leu Pro Val		
452	35 40 45		
455	Asn Glu Gln Gln Leu Arg Thr His Val Asn Leu Ser Gln Asp Ile Ser		
456	50 55 60		
459	Ile Pro Ser Asp Phe Ser Gln Leu Tyr Asp Val Tyr Cys Ser Asp Lys		
460	65 70 75 80		

VERIFICATION SUMMARY
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L:11 M:271 C: Current Filing Date differs, Replaced Current Filing Date